Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Optimism-pessimism, conspiracy theories and general trust as factors contributing to COVID-19 related behavior – A cross-cultural study

Ana Jovančević*, Nebojša Milićević

University of Niš, Faculty of Philosophy, Department of Psychology, Serbia

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ABSTRACT

The main aim of this research was to examine the role of optimism-pessimism, general trust and belief in conspiracy theories, in COVID-19 related fears, preventive and hoarding behaviors. We also examined the role of different sources of information in these relations. The convenience sample was used (N = 412) and it consisted of individuals from Serbia (N = 292) and Latin-America (N = 120). Following instruments were used: The Life Orientation Test (Scheier, Carver, & Bridges, 1994), Trust in people scale (Arbor, 1964), questions regarding fear, source of information, preventive behaviors and conspiracy constructed for the purposes of this research. The results suggest that fear of food shortage was the most pronounces one in both samples, followed by fear for oneself and finally by the fear for beloved others. Results suggest that optimists, those with high level of general trust and those who do not believe in conspiracy theories show lower level of fear and higher level of preventive behaviors. Pessimists on the other hand, show higher level of fear. Fear was related to all information sources suggesting that more information leads to higher intensity of fear – except information from the president which did not show any effect.

1. Introduction

The main aim of this research is to check the role of optimism-pessimism, trust, sources of information, conspiracy theory and fear in COVID-19 related behaviors.

COVID-19 pandemic spread across many nations in the world, leading to mass changes in the day to day world activities. There were 1,582,524 COVID-19 positive cases with around 100,479 deaths[1] when this research was being conducted. Among others, COVID-19 pandemic has many psychological effects and individuals differ in their preventive behavior needed in order to suppress COVID-19. COVID-19 related psychological problems include: panic attacks, anxiety and depression (Qiu et al., 2020) and fear (Van Bavel et al., 2020) as a normal human response to threat and uncertainty (Milićević, Milenović, & Marković, 2016). Functional fear of COVID-19 is related to respect of recommended preventive measures (Harper, Satchell, Fido, & Latzman, 2020), but fear can also lead to hoarding behaviors (Arafat et al., 2020). Studies show that belief in conspiracy theories is associated with lower possibility in engaging in socially desirable activities connected to those theories (Van der Linden, 2015) and in COVID-19 pandemics, with more hoarding (Imhoff & Lamberty, 2020). Fear, on the other hand, can be caused by misinformation (Depoux et al., 2020) which is spreading rapidly regarding COVID-19 - with the main theme that it was created in the laboratory by a rouge government with some agenda (Mian & Khan, 2020). This agrees with definition of conspiracy theories including a powerful individual(s), organization(s) or group(s) trying to accomplish their sinister goal at the coast of those less powerful and important (Van der Linden, 2013). Because of all previously stated we included both fear and conspiracy in our research.

Besides conspiracy, information by itself has been proven important in pandemics behavior. Studies regarding H1N1 influenza showed that people who had adequate information mostly received these information from health professionals, and showed higher frequency of preventive behaviors in comparison to those who collected their information through family/friends and news-based websites (Etingen, LaVela, Miskevics, & Goldstein, 2013). Trust was shown to be a key factor in compliance with recommendations in H1N1 influenza (Prati, Pietrantoni, & Zani, 2011). Trust can be defined as *"reliance upon information received from another person about uncertain environmental states and their accompanying outcomes in a risky situation"* (Schlenker, Helm, & Tedeschi, 1973, p. 419). COVID-19 pandemic indeed represents a risky situation. Trust is also related to higher interpersonal collaboration (Schlenker et al., 1973) much needed in situations like this. In addition, belief in conspiracy in connected to lower general trust

* Corresponding author at: University of Niš, Faculty of Philosophy, Department of Psychology, Cirilo and Metodije 2, Niš 18000, Serbia.
E-mail address: ana.jovancevic@filfak.ni.ac.rs (A. Jovančević).

[1] Coronavirus Cases: (n.d.). Retrieved April 9, 2020, from https://www.worldometers.info/coronavirus/

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(Wood & Douglas, 2013). Combining the results of previous studies regarding role of trust in the information sources with definition of trust, and with the fact that global trust was not measured in similar studies we deemed it important to examine the role of global trust in this study.

Further, research from the beginning of COVID-19 pandemics has shown that Europeans are overly optimistic regarding this virus (Raude et al., 2020). Unrealistic optimism is related to lower preventive behaviors regarding health (Weinstein, 1982) while regarding SARS it was shown that optimism is positively correlated with vigilance (pessimism correlated with anxiety) (Xie, Stone, Zheng, & Zhang, 2011) Optimists have better strategies of coping with stressful situations (Scheier, Weintraub, & Carver, 1986), less stress, fewer depressive symptoms, higher well-being (Chang, 1998; Khoo & Bishop, 1997), lower trait anxiety (Sumi, Horie, & Hayakawa, 1997) and internal locus of control (Guarnera & Williams, 1987). Pessimists are more prone to conspiracy theories (Furnham, 2013). So, optimism-pessimism dimension has shown its importance, but the results regarding its role are inconclusive – hence the need to include this variable in our research,

1.1. Present research

In this research we included two samples – Serbian and Latin-American. This choice was maid based on their similarities and differences. They were found to be similar on three out of six dimensions of Hofstede (2011) (through the Hoftede insights web page[2]): Individualism (low), Masculinity (middle) and Uncertainty avoidance (high); and different on other three: Power distance (SRB = High, LA = Middle), Long term orientation (SRB = Middle, LA = Low) and Indulgence (SRB = Low, LA = High). Further, these two cultures had similar history regarding hyperinflation (Beckerman, 1995; Petrović & Vujošević, 1996). Study regarding culture and COVID-19 pandemics (Dheer, Egri, & Treviño, 2020) shows that cultures leaning towards collectivism, hierarchy and restrain have greater success in implementing recommended behavior, while those leaning towards individualism, autonomy, egalitarianism and indulgence will find this task difficult. Taking into account that these two cultures are somewhat similar but also different in some ways, and that they were not compared before we consider this comparison to be important.

The problem of this study is to check the role of fear, conspiracy and information found in previous papers, in addition of general trust and clarifying the role of optimism-pessimism on two cultures not compared in previous papers as no previous research regarding the role of all these variables was found.

2. Method

2.1. Sample

The convenience sample was used and it consisted of 412 respondents (Table 1) from Serbia (N = 292, Male = 42, Female = 250) with age range from 18 to 65 (M = 30.34; SD = 9.89) and Latin-America (N = 120, Male = 25, Female = 95) with age range from 18 to 66 (M = 33.51, SD = 11.23). None of the respondents were diagnostified with COVID-19.

All respondents gave their informed consent to participate in the research.

2.2. Instruments

2.2.1. The Life Orientation Test-Revised (LOT-R, Scheier, Carver, & Bridges, 1994)

LOT-R was used to operationalize optimism-pessimism. This is a 10-item scale, out of which 4 items are filters used to attract attentions from the items operationalizing optimism-pessimism (α = 0.76).

Table 1
Description of the sample.

Variables	Nationality	
	Serbia	Latin-America
	%	%
Elementary school	0.3%	/
High school	33.9%	9.2%
College	6.2%	/
University	35.3%	76.7%
MSc	21.9%	11.7%
Ph.D.	2.4%	2.5%
COVID-19 positive friend/acquaintance	32.2%	9.2%
Close relative older than 65	33.9%	24.2%

2.2.2. Trust in people scale (Arbor, 1964)

A 3-item questionnaire designed to measure individuals' general level of trust towards other people. Each of the three items provides a dichotomous choice, one choice being the high trust response and the other low trust response. This scale was first used in the 1964 election study. Later studies confirmed its reliability and validity (Robinson, Shaver, & Wrightsman, 2013) so it is established as a scale fit to use for the other research purposes (α = 0.70).

2.2.3. COVID-19 related fears

Three questions regarding fear in COVID-19 pandemic: fear of oneself being infected, fear of beloved others being infected and fear of food shortage. Reliability for fear was below border level (α = 0.44). According to suggestions of previous authors for reliability of small number of items (Briggs & Cheek, 1986) we calculated mean inter-item correlation and gotten value of 0.21, which is between the recommended borders for this kind of reliability analysis.

2.2.4. Information sources and trust in those sources

Nine questions regarding sources of information about COVID-19: crisis staff of the government, prime minister, president, doctors-in the news, other doctors, forums, social networks, health organization web pages and friends (α = 0.63). Nine equivalent questions regarding the trust in those sources (α = 0.69).

The questions about fear (2.2.3.) and information sources (2.2.4.) were comprise on the basis of a pilot study (SRB = 22, LA = 20) where people were asked open questions.

2.2.5. Hoarding

Two questions regarding hoarding behavior: “I buy groceries every day” and “I have enough supplies for few months”. One question regarding hoarding was modeled on the question asked by Oosterhoff and Palmer (2020) while the question regarding supplies was added in this research. Since there are only two questions here, we calculated mean inter-item correlation for reliability (0.21).

2.2.6. Preventive behaviors

Six questions regarding respect for preventive measures (α = 0.73). These questions were formed on the basis of the measure taken in order to prevent COVID-19 spreading.

2.2.7. Belief in conspiracy

One question regarding belief that COVID-19 was created on purpose in the laboratory was asked. It was created based on Mian and Khan's (2020) paper where they state that all conspiracy theories about COVID-19 have the same theme: the virus was created in the laboratory on purpose. Reliability for one item can be calculated though factor

[2] Retrieved from: https://www.hofstede-insights.com

analysis (Wanous & Hudy, 2001) since total variance of an item equals Communality + Specificity + Unreliability, communality can be a measure of reliability (0.68).

2.3. Procedure

All the data was collected via internet – through Google forms and Facebook. The research was conducted in the period from 2nd to 9th April 2020.

2.4. Data analysis

The data was analyzed through ANOVA and MANOVA for comparison of two samples (Bonferroni correction was used for all multiple comparison analyses) and through Structural Equation Modeling in order to examine relation between all variables – this could not be achieved with other method. To calculate post hoc statistical power for RMSEA (one of the fit indices for SEM), R programming language was used.

3. Results and discussion

Means and standard deviations of the study variables are presented in Table 2.

Serbians and Latin-Americans were compared through MANOVA. Statistically significant differences, in favor of Serbians were found on the amount of information obtained by the crisis staff ($F_{(1, 410)} = 4.19$; $p < .05$), from friends ($F_{(1, 410)} = 18.99$; $p < .01$), not visiting the elderly ($F_{(1, 410)} = 7.73$; $p < .01$), not receiving guests ($F_{(1, 410)} = 5.25$; $p < .05$), curfew ($F_{(1, 410)} = 14.86$; $p < .01$) and on the fear for loved ones ($F_{(1, 410)} = 48.58$; $p < .01$). Differences in favor of Latin-Americans were found on the amount of information obtained by the President ($F_{(1, 410)} = 11.73$; $p < .01$), through health web pages ($F_{(1, 410)} = 5.18$; $p < .05$), on fear of food shortage ($F_{(1, 410)} = 26.58$; $p < .01$) and on hoarding ($F_{(1, 410)} = 92.94$; $p < .01$). Latin-Americans show higher trust in Prime minister, President and Doctors, while Serbians show higher trust in friends ($p < .05$).

Table 2
Descriptive statistics.

Variable	Nationality			
	Serbian		Latin-American	
	Mean	SD	Mean	SD
COVID lab	3.18	1.24	3.18	1.53
Crisis staff	3.50	1.36	3.18	1.57
Prime minister	2.73	1.46	3.00	1.64
President	2.79	1.49	3.36	1.58
Doctors news	3.73	1.27	3.78	1.26
Doctors else	3.05	1.45	3.24	1.52
Forums	2.38	1.37	2.58	1.39
Social networks	2.80	1.39	2.83	1.48
Health web pages	3.12	1.46	3.48	1.46
Friends	2.67	1.26	2.08	1.24
Crisis staff trust	3.04	1.27	3.09	1.35
Prime minister trust	2.45	1.33	2.76	1.58
President trust	2.39	1.36	2.89	1.60
Doctors news trust	3.43	1.18	3.83	1.22
Doctors else trust	3.24	1.15	3.39	1.30
Forums trust	2.10	1.09	2.10	1.29
Social networks trust	2.24	1.05	2.06	1.12
Health web pages trust	3.29	1.28	3.44	1.45
Friends trust	2.53	1.14	2.01	1.18
Hand hygiene	4.71	0.58	4.64	0.84
House hygiene	3.77	1.12	3.89	1.17
Leaving the house	4.56	0.79	4.44	1.00
Visiting elderly	4.71	0.79	4.43	1.20
Guests	4.55	0.92	4.30	1.25
Curfew	4.88	0.55	4.56	1.07
Fear me	2.96	1.23	2.97	1.30
Fear others	4.42	0.93	3.63	1.30
Fear food	1.85	1.06	2.49	1.33
Buying groceries	2.95	1.17	2.89	1.27
Supplies	1.46	0.86	2.53	1.33
Trust	0.74	1.00	1.24	1.12
Optimism	21.83	4.76	20.87	5.03

In order to compare information received from different sources (in two samples separately), standardized values of these questions were analyzed trough ANOVA for repeated measured and Bonferroni post hoc test. The results show that both in Serbians ($F_{(1, 269)} = 0.27$; $p > .05$) and Latin-Americans ($F_{(1, 269)} = 0.49$; $p > .05$) statistically significant differences were not found through omnibus test. Post hoc testing shows that Serbs gather most information through crisis staff ($p < .05$) and Latin-Americans through the president ($p < .01$).

Differences regarding crisis stuff in favor of Serbians can be explained by the fact that the crisis stuff, in Serbia, was present on TV on nearly all frequencies each day – making it impossible to avoid. Differences regarding President and higher trust of Latin-Americans in Prime minister, President and Doctors can be explained by higher Power distance in Serbians (Hofstede, 2011) which includes expectations of unequal power distribution. This could be the reason why Serbians show lower trust in higher authority figures and higher in friends from whom they gather much of the information. Serbs show higher obedience towards COVID-19 measures which can also be accounted by higher Power distance.

ANOVA for repeated measures was also conducted in order to compare the intensity of different fears. For Serbians ($F_{(1, 290)} = 5617.75$; $\eta^2 = 0.95$; $p < .01$) and for Latin-Americans ($F_{(1, 290)} = 1032.45$; $\eta^2 = 0.90$; $p < .01$) significant differences were found between all three fears ($p < .01$).

Fear of food shortage was found to be the most intense one in both samples. The results from previous papers indicate that food insecurity is still an issue in Latin-America (Corral, Winters, & Gordillo, 2000) and Serbia (Brankov & Milovanović, 2015). We can also recall Maslow's hierarchy of needs and that the most basic need is the need to obtain basic necessities for life – food being one of them (Koltko-Rivera, 2006). These results could also reflect the food shortage during Yugoslav (1991–1993: Petrović & Vujošević, 1996) and Argentina hyperinflation (1989–1990: Beckerman, 1995). Fear for food is followed by fear for oneself and, in the end, by fear for others, which is also in accordance with Maslow's theory (Koltko-Rivera, 2006). The same layout of fear in two samples can be accounted by high score on Hofstede's (2011) Uncertainty avoidance in both cultures, which indicates lower tolerance for ambiguity and higher stress in uncertain situations. Latin-Americans show higher fear of food shortage and hoarding, which can be accounted by their high Indulgence score (Hofstede, 2011). Higher fear for loved ones in Serbia can be accounted by their slightly higher percentage of elderly – which are high risk population for COVID-19.

Correlation between the source of the information and trust in that source ranged from medium to the high correlations (Serbians: from $r = 0.60$ to $r = 0.72$; Latin-Americans: from $r = 0.47$ to $r = 0.73$; $p < .05$). These results indicate that higher trust in source is correlated to higher possibility of gathering information from that source.

Metric invariance was checked for used questionnaires. Both The Life Orientation Test (Scheier et al., 1994) (Measurement weights: $CMIN = 8.75_{(5)}$, $p = .120$) and Trust in people scale (Arbor, 1964) (Measurement weights: $CMIN = 0.82_{(2)}$, $p = .67$) possess adequate metric invariance. Metric invariance could not be checked for other questions because that they were analyzed as individual items.

After this we conducted SEM in order to further examine the relations between variables in our research. The initial model had adequate fit indexes ($\chi^2 = 180.34$, $p = .000$; $\chi^2/df = 1.74$; GFI = 0.97; IFI = 0.97; CFI = 0.97; RMSEA = 0.04, PCLOSE = 0.89; SRMR = 0.03). Taking in the account the size of the sample, post hoc power for RMSEA was calculated through R programming language

Table 3
Regression weights.

Variables			Latino-American		Serbian	
Outcome variable		Predictor	Estimate	*p*	Estimate	*p*
Trust	←	Optimism	0.29	0.00	0.25	0.00
COVID lab	←	Trust	−0.06	0.51	−0.14	0.01
Fear food	←	Trust	0.19	0.96	0.16	0.01
Fear me	←	Optimism	0.01	0.97	−0.19	0.00
Hand hygiene	←	Optimism	0.07	0.00	0.16	0.01
Leaving the house	←	Optimism	0.09	0.01	0.28	0.00
Gests	←	Optimism	−0.12	0.01	0.16	0.02
Curfew	←	Optimism	0.05	0.01	−0.10	0.06
Buying groceries	←	Optimism	0.25	0.86	0.17	0.00
Visiting elderly	←	Trust	−0.04	0.01	0.10	0.08
Buying groceries	←	Trust	−0.00	0.54	−0.15	0.01
Fear me	←	Prime minister	0.00	0.01	0.10	0.08
Fear food	←	Prime minister	0.11	0.90	0.11	0.03
Fear others	←	Social networks	0.16	0.51	0.18	0.00
Fear food	←	Social networks	0.25	0.00	0.16	0.01
Fear me	←	Friends	−0.07	0.99	0.12	0.04
Gests	←	COVID lab	−0.04	0.00	−0.11	0.03
Curfew	←	COVID lab	0.21	0.01	0.16	0.01
Hand hygiene	←	Fear me	0.23	0.06	0.14	0.02
Gests	←	Fear me	0.17	0.02	0.19	0.01
Hand hygiene	←	Fear others	0.02	0.01	0.13	0.09
House hygiene	←	Fear others	−0.08	0.36	0.13	0.07
Curfew	←	Fear others	−0.11	0.00	0.04	0.66
Buying groceries	←	Fear food	0.27	0.02	0.13	0.02
Supplies	←	Fear food	0.03	0.01	−0.02	0.79
Leaving the house	←	Crisis staff	0.08	0.02	−0.11	0.13
Gests	←	Prime minister	−0.00	0.00	−0.10	0.09
House hygiene	←	Doctors news	−0.02	0.00	0.11	0.07
Visiting elderly	←	Doctors news	−0.08	0.28	−0.18	0.00
Curfew	←	Doctors news	−0.14	0.05	−0.04	0.40
Buying groceries	←	Doctors news	0.05	0.07	0.16	0.00
House hygiene	←	Forums	0.12	0.85	0.13	0.02
Supplies	←	Forums	0.10	0.12	0.11	0.03
Leaving the house	←	Social networks	−0.15	0.03	−0.04	0.54
Curfew	←	Social networks	0.13	0.57	0.13	0.03
Buying groceries	←	Social networks	0.25	0.01	0.09	0.08
Hand hygiene	←	Health web pages	0.17	0.03	0.02	0.69
Curfew	←	Health web pages	0.02	0.04	0.15	0.01
Supplies	←	Friends	−0.05	0.12	−0.12	0.05

(package "semPower", function "semPower.postHoc"). Power for RMSEA for this model was 0.99.

We then excluded all the pathways insignificant for both samples from the model. The shortened model (Table 3) also showed a good fit ($\chi^2 = 291.03$, $p = .09$; $\chi^2/df = 1.12$; GFI = 0.94; IFI = 0.98; CFI = 0.98; RMSEA = 0.02, PCLOSE = 1.00; SRMR = 0.04). Power for RMSEA for shortened model was 0.96 (package "semPower", function "semPower.postHoc"). Shortened model is shown in Graph 1.

The results show that lower levels of general trust predicts belief that COVID-19 was created on purpose, which is in accordance with previously found negative correlation between trust and belief in conspiracy theories (Wood & Douglas, 2013). This was only true for Latin-Americans. When it comes to Serbians it seems that belief that COVID-19 was created in the laboratory steams from another psychological construct not accounted for in this research. Further, trust predicted adequate COVID-19 related behaviors like not visiting elderly (Serbians) and low levels of hoarding (Latin-Americans), which can be accounted by the fact that general trust was proven to be necessary for normal functioning in social world (Jones, Couch, & Scott, 1997). These results were found in other studies regarding COVID-19 (Oosterhoff & Palmer, 2020). Further, belief in conspiracy theories was positively related to respect of the curfew but negatively with the respect regarding not receiving guests. One possible explanation for results regarding guests is that conspirators believe that social isolation serves some greater skim of keeping us apart.

Interestingly, trust predicted higher levels of fear of food shortage. These results can indicate that those high on trust believe the gravity of the situation, but they are not gullible (Jones et al., 1997) because of which they remember food shortage in their cultures (Brankov & Milovanović, 2015; Corral et al., 2000) – and hence the fear of food shortage is predicted by high levels of trust. Fear of food shortage then leads to hoarding behaviors – which can be understandable when lack of food security is taken into account.

High levels of optimism predicted high levels of respect towards measures taken against COVID-19 spreading. Optimism was found to be positively related to internal locus of control (Guarnera & Williams, 1987). Combining this finding with our results we can assume that optimists believe that they can control their faith because of which they deem it relevant to respect measures taken to suppress COVID-19. On the other hand, high optimism was related to higher possibility of receiving guests on Serbian sample. This result can be related to one of the key aspects of optimism – sociability (Maltby, Lewis, & Hill, 1998) and unrealistic optimism when health is considered (Weinstein, 1982) but also with high need to socialize present in this culture. So it is possible that combination between sociability and unrealistic beliefs lead to lower levels of precautions taken when receiving guests comes in question. Belief in destiny (Mihić, Šakotić-Kurbalija, & Franceško, 2005) as one aspect of national identity in Serbia could be reason for the cross-cultural differences. It seems that socializing is more important to Serbians than precaution measures are. It is also important to mention that at the beginning of pandemics Europeans showed unrealistic optimism (Raude et al., 2020) so it is possible that this unrealistic optimism was retained for aspects of life most important to people of this culture even when pandemic advanced.

Results also show that all forms of fear elicit responsible behavior. This is in accordance with recent study (Harper et al., 2020) and can suggest that perceiving COVID-19 as real danger with fear as the component leads to preventive behaviors. Fear is, on the other hand, predicted by the received information. One possibility is that being more informed also means taking COVID-19 treat serious enough to be afraid.

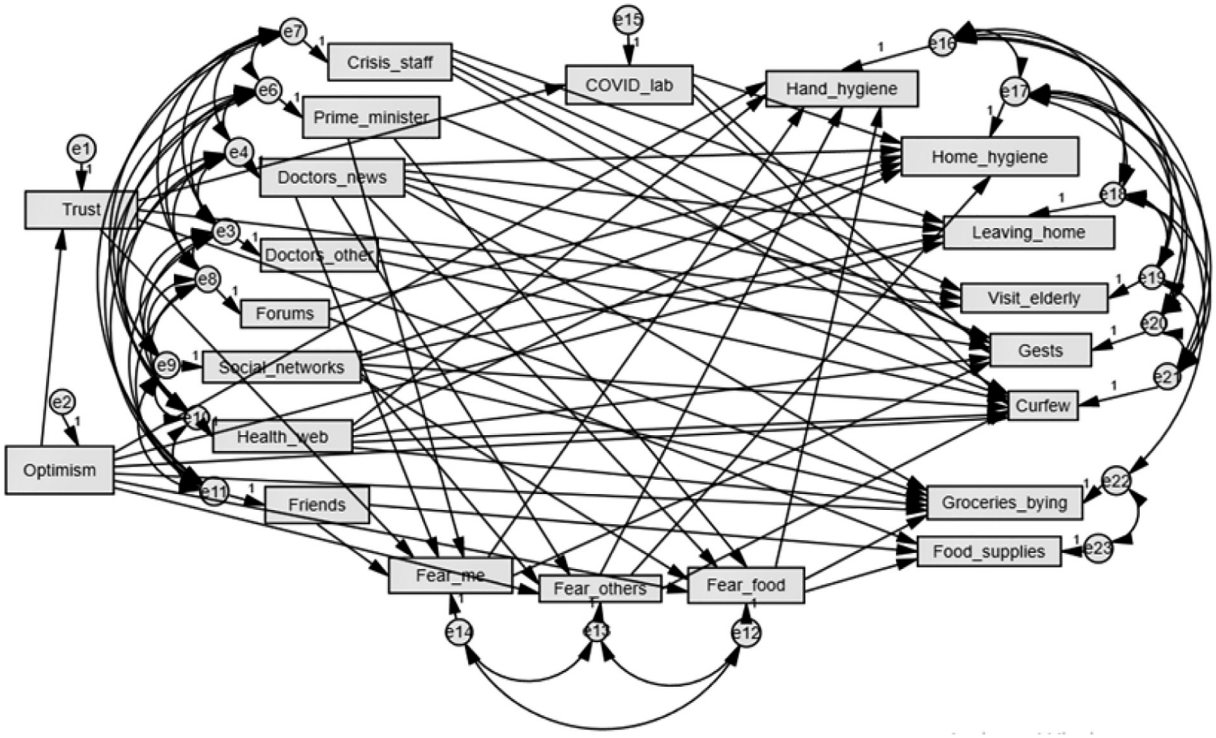
Further, optimism and trust are predictors of lower levels of fear and also lead to socially desirable behaviors. By recalling that optimists generally show more positive emotions (e.g. Chang, 1998; Nelson, Karr, & Coleman, 1996) and better coping strategies (Scheier et al., 1986) as well as internal locus of control (Guarnera & Williams, 1987) we can explain higher levels of preventive behaviors and lower levels of fear – they always expect the best possible outcome and do what they believe will lead them to that outcome. Those with higher levels of trust believe others who tell them that preventive measures have an effect – which can also account for lower levels of fear in them.

4. Conclusions

General conclusion from our research is that the most pronounced fear in these two samples is the fear of food shortage. Results also show that information sources are positively related to fear – meaning that being more informed irrelevant of the type of source leads to higher levels of fear. Further, results indicate that optimists, those who trust others and do not believe in conspiracy theories regarding COVID-19 engage themselves in preventive behaviors but not in hoarding. On the other hand, pessimists, those who do not trust others and those who believe in conspiracy theories engage in preventive behaviors but also in hoarding behaviors and exhibit higher levels of fear. On the other hand, it was shown that optimism can also lead to receiving guests in Serbia – meaning that its effect on COVID-19 related behavior is not necessarily positive. Further, Latin-Americans show more hoarding and higher fear of food shortage than Serbians.

Theoretical contribution of this paper refers to better understanding of what variables as well as cultural differences are responsible for respect of recommended behavior in COVID-19 pandemics.

Practical implications could be usage of the results in defining



Graph 1. Shortened model.

different methods for different cultures when implementing recommended measures in this and similar situations.

4.1. Limitations of the study

First limitation of this study is the sample. For future research we suggest inclusion of other cultures and their comparison with Latin-Americans and Serbians. The inclusion of equal number of respondents from different Latin-American countries would also be appropriate.

We also recommend inclusion of locus of control and coping with stress.

And finally, this study was conducted on individuals not-diagnostified with COVID-19. We recommend examination of the view of COVID-19 pandemic from the angle of those who were infected.

CRediT authorship contribution statement

Ana Jovančevič:Conceptualization, Software, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Visualization.**Nebojša Mili**čevič:Methodology, Writing - review & editing, Supervision, Project administration, Validation.

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